01-050

TEXAS DEPARTMENT OF HEALTH

AUSTIN, TEXAS

INTER-OFFICE MEMORANDUM

TO: Regional Directors
Directors, Local Health Departments
Directors, Independent WIC Local Agencies
Herman Horn, Chief, Bureau of Regional/Local Health Operations

FROM: Barbara Keir, Director
Division of Public Health Nutrition and Education
Bureau of Nutrition Services

DATE: April 13, 2001

SUBJECT: Formula Conference Call for April 24, 2001

The next formula conference call is scheduled for April 24, 2001. The April conference call will be on Using The Developmental Approach to Feeding Premature Infants. Please review the attached notes prior to the conference call. In addition, we recommend the handout "Let's Eat! Food for Baby's First Year" be available for reference during the call. This conference will be audio taped and the tape will be available upon request.

To connect to the conference call on April 24, 2001, dial (512) 463-1928. Then enter: 1501518# (Don't forget to enter the pound sign at the end.)

Projects # 1 - 53 Assigned to 10:00 - 11:30 time slot
Projects #54 -106 Assigned to 12:00 - 1:30 time slot

If this time interferes with local agency plans, please let us know and we will move you to the other time slot. We are limited in the numbers for each time slot, so please let us know as soon as possible. If you have any questions, please feel free to contact Roxanne Robison, Children with Special Health Care Needs Nutrition Consultant at (512) 458-7111 extension 3495, or Patti Fitch, Clinical Nutrition Coordinator at (512) 458-7111 extension 3598. You may order tapes from Fran Manor at (512) 458-7111 extension 2126.

Attachment

Feeding Premature Infants According to Developmental Readiness

Introduction

Most full-term, healthy infants follow a standard pattern of development for feeding progression, as outlined in **Table 1**. However, many infants who were born prematurely and/or who had a low birth weight (or children with special health care needs) may need to follow a different time frame for feeding progression. Although all infants should progress to new foods based on their developmental readiness, it is more likely that infants who were born prematurely or with low birth weights will not progress according to these typical time frames. Routine recommendations for food progression may not apply to these infants.

Calculating Corrected Age

In general, a premature infant's **corrected age** is used when making recommendations for adding new foods to their diet rather than the infant's **chronological age**. Keep in mind, however, that some premature/low birth weight infants are slower to reach developmental stages even when corrected age is used. Conversely, some premature infants may catch up developmentally earlier than expected. Therefore, the best recommendations are made using developmental readiness as a guide.

When calculating corrected age, 40 weeks gestation is used (to represent full-term). To calculate the correction factor, subtract the number of weeks gestation from 40 weeks:

For example: 40 weeks - 25 weeks gestation = 15 weeks premature

Next, divide 15 weeks by 4 (approximate number of weeks in a month) =

3 ¾ months premature.

This amount should be subtracted from the infant's chronological age

to determine the corrected age. For example, an infant who is 5 months

old chronologically, would be 1 ¼ months corrected age.

5 months old - 3 ¾ months premature = 1 ¼ months corrected age

Table 1. Sequential Development of Feeding Behavior

Typical age of readiness	Food	Offer this food when
1-3 months	Breastmilk or Formula	Infant has: • Poor head control • Obtains milk through a suckling pattern, the tongue projects during a swallow
4-6 months	Single grain infant cereal and pureed single ingredient foods	Infant can: • sit with support • fully support head and neck • take food without choking or gagging • strong extrusion reflex has faded • transfer food from front of the tongue to the back of the tongue for swallowing • open mouth for spoon • draw in the lower lip as spoon is removed
7-9 months	soft, lumpy foods such as fork mashed banana or potato, smashed macaroni and cheese, rice, cottage cheese and other foods that stick together	• sits independently • begins side to side lateral tongue movement • up and down chewing movements • holds own bottle but cannot tip the bottle to help it empty until about 8 months of age • brings head forward to receive the spoon
7-9 months	large finger foods such as Zwieback toast and biter biscuits	• sits independently and maintains balance while using hands to reach and grasp objects • holds items with a palmer (whole hand) grasp
10-12 months	smaller finger foods, such as Cheerios, diced fruits and diced soft, cooked vegetables	• develops pincher grasp that allows infant to pick up food between thumb and finger • rotary chewing movement begins

If an infant has delayed feeding ability even when corrected age is used as a guide, a referral to a feeding therapist may be in order. Beginning solid foods earlier may be appropriate if the infant seems to be catching up developmentally earlier than expected. Conversely, spoon feeding may be delayed if extraordinary neurological impairment is apparent.

What is the Problem with Introducing Foods Before the Infant is ready?

- Premature babies have higher nutrient needs than full-term infants. Premature infants need extra minerals in their diets to build strong bones. These minerals, which should have been attained during the last trimester, must be given in higher amounts in the diet to meet their nutritional needs. Introducing foods other than breastmilk or formula can decrease the amount of calcium, phosphorus, zinc and other minerals, vitamins and protein that the baby gets from milk. Cereal, fruits and vegetables are poorer sources of these nutrients, which are important for catch up growth. When weaning foods are introduced early they displace the amount of milk the baby might otherwise receive thereby lowering the nutritional content of the diet.

- There is an increased risk that the infant could develop food allergies due to an immature immune system.

- It is not uncommon for the parent to develop feelings of inadequacy and anxiety when they are unable to successfully feed their infant. This can contribute to feeding disorders.

- Increased risk for gagging, choking and development of feeding aversion.

When the WIC program issues cereal to caretakers of prematurely born infants without instructions on developmental readiness, many caretakers take this as an indication that the infant needs to start taking cereal. When the infant is not able to take cereal from a spoon, unnecessary anxiety can develop because the care giver feels that the infant is unable to do what they are supposed to be able to do compared to other infants. The parents may feel that the cereal is nutritionally important in their baby's diet and when the infant is unable to take it from a spoon, it is often put in the bottle. As already stated, adding cereal to formula or breastmilk produces a less nutritious feeding by diluting it with increased carbohydrate, lowering the protein content, and decreasing the calcium, phosphorus and other mineral content of the diet.

Feeding Problems of Premature Infants

Some premature infants do not meet their feeding milestones even when corrected age is used as a guide. Typically, these infants have either developed a feeding aversion and have difficulty transitioning to different textures and/or they have neurological impairment.

Feeding Aversion

Some preemies that have difficulty transitioning from one texture to another have had traumatic oral experiences in the NICU. Consider that a normal healthy infant experiences soft kisses and either warm feedings at a soft breast cradled in the arms of their mother or bottle feedings of warm formula. The experience of a premature infant may have been remarkably different with plastic feeding tubes through their nose or mouth providing milk pumped into their stomach, a respirator to assist with breathing, and perhaps suctioning tubes. These tubes may have had to be removed and replaced multiple times. In addition, the premature infant may have not had opportunities for "mouth play" such as putting their own fingers in their mouth which can desensitize the area to touch. A spoon in the mouth or a small lump in their food can cause an extreme reaction such as gagging, choking, coughing, or even vomiting.

Muscular and/or Neurological Impairment

There are many reasons why an infant can be born prematurely. A premature birth may be due to an infection, congenital malformations, certain chromosomal abnormalities, drug exposure, placental insufficiency or spontaneous labor of unknown origin, to name a few. Therefore, premature infants can vary widely in their feeding problems, depending on what systems are affected. Babies who have muscle tone problems - either too tight or too flaccid - may also experience problems with tongue coordination, cheek , lip, and jaw movements. Remember, the tongue, lips and cheeks are muscles. Some babies may have problems moving the tongue from side to side which is necessary to get food between the gums or teeth for chewing. Cheeks are necessary to keep the food over the teeth for chewing. Cheeks that are too floppy cannot keep the food between the teeth and it may fall off into the cheek pouches. The tongue may not be able to retrieve the food again.

Immature tongue movements may continue to push food forward out of the mouth rather than keeping it in the mouth. This can also happen with children who had prolonged intubation. For some children, the food becomes too scattered in the mouth and they don't have the ability to collect it together efficiently for swallowing.

Neurological damage can also effect how muscles move. Food progression may not necessarily follow in a normal sequence as for the healthy term infant.

Things to Consider for the Premature Infant

1. Flag the participant's record with the fact that he/she was premature and to not automatically issue cereal without assessing for developmental readiness.
2. At the very least, at time of certification, the CPA should counsel the parent that they will be issued cereal when their infant reaches 4 months of age. Counsel the parent that even though cereal will be issued, the infant may not be developmentally ready to take cereal. Counsel that the baby's age should be adjusted and give the pamphlet "Let's Eat". Reinforce that the parent should look at the infant's ability in the "What baby does" column instead of the baby's age column.
3. If the baby is not meeting developmental feeding milestones using corrected age, consider a referral to ECI (1-800-250-2246) for feeding therapy.
4. Consider requesting a prescription to continue the infant on formula until one year corrected age. When considering this, think about how premature the infant was. The more premature the infant the more likely he benefit from continuing formula. What does the rest of the diet look like? If he is delayed in feeding skills and unable to consume an age appropriate diet, he will likely be taking a large amount of formula, i.e., 32 ounces or more per day. In this case, it would be harmful to switch to whole milk as this same consumption of whole milk could lead to iron deficiency anemia and other nutrient deficiencies as well as constipation from excess mineral load.

Definition of Terms

Adjusted Age - see corrected age

Chronological Age - the age of an infant from birth to the present. Chronological age is sometimes called postnatal age.

Corrected age - the age of an infant, minus the number of weeks premature. Corrected age may also be referred to as the adjusted age.

Gestational age - the number of completed weeks that have elapsed from the first day of the last normal menstrual period and the date the infant is delivered, normally 38 to 42 weeks.